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FIVE YEARS OF SYPHILIS SEROLOGY*

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Introduction

Why only "Five Years of Syphilis Serology" and which five years in a history which covers more than thirty years? The five years from 1935 to 1940 have been a full and interesting period in the progress of laboratory aids for diagnosing syphilis. The tabulation and analysis of reports returned in the national evaluation studies during this period have provoked numerous questions, some speculation, and have brought about far-reaching plans for improving the general performance of serologic tests.

The answers to some of the questions, the results of the speculative thought, and the initiation and furtherance of plans for improvement show five years of progress which compare with another eventful five years in the history of syphilis, beginning in

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1905 when Shaudinn and Hoffman identified the *Spirochaeta pallida* as the causative agent of the disease. Then followed the work of Wassermann, Neisser and Bruck in 1906, which resulted in the first complement-fixation method for the diagnosis of syphilis; then the observation by Michaelis in 1907 of the precipitation phenomenon on which so many of our present-day methods are based; and two years later, in 1910, the introduction by Ehrlich of the organic arsenicals as therapeutic agents. These constitute five epochal years fraught with original contributions. But in this country at least it is pleasing to consider the progress of the immediately past five years in the application of fundamental principles observed twenty-five or thirty-five years ago.

Early Efforts

The lack of definite information concerning the many, many methods used for the laboratory diagnosis of syphilis was felt throughout the years, but it was not until 1934 that an organized effort was initiated by which their relative efficiencies might be approximated.

At that time there was an awakening of interest in the disease, resulting in the removal of the stigma which had theretofore forced the medical profession to be practically alone in its efforts to control or combat syphilis. It became possible then for the clinicians to enlist the aid of other agencies, to publicize weaknesses which they knew were existent, and to use these forces in formulating and instituting remedial measures.

The Committee on the Evaluation of Serodiagnostic Tests for Syphilis began and still continues its work under the auspices of the United States Public Health Service and the American Society of Clinical Pathologists. It is composed of both laboratorians and clinicians, all interested in the improvement of laboratory methods and in the results which enter into the diagnosis and treatment of syphilis.

The original and continuing aim of the Committee is to bring about a higher caliber of, and to increase uniformity in, serologic test performance reports. The Committee has tried to be constructively critical and has not intended to foster that type of competi-



tion which engenders futile antagonism between the laboratories which cooperate with it. The first study in 1934 was the supervision of a survey of the efficiency of thirteen (13) methods originating in America. Accepting as master or control methods several procedures which received creditable efficiency ratings in that survey, the studies have been repeated annually. They have sought to compare results of similar methods in the laboratories of the originators of the various tests and in the State laboratories, and, by the discreet publication of the data derived therefrom, to provoke and encourage improvements in methods and in performance.

Two successive surveys proved that there was far too much variation among the results obtained in the participating laboratories using the same technics, so the conduct of the work was modified in order that some of the causes for the extreme variations might become evident.

The laboratories reporting results of complement-fixation tests which were compared with the results on identical specimens tested by the Kolmer quantitative complement-fixation method in that author's laboratory, showed wide variations and radical differences as common findings—very, very few performances approached the efficiency of that of the master laboratory. A critical review of the descriptions of technics revealed comparable departures from the description published by Dr. Kolmer.

In the same year a large number of laboratories reported results of the Standard Kahn Precipitation tests; although displaying greater uniformity these results readily pointed to the fact that the performances yielding the greatest differences from Dr. Kahn's own results were guilty of the gravest departures from the published description of his method.

It was evident that merely informing the laboratories of their relative efficiency ratings was not sufficient to bring about the incorporation of methods and of technic which would produce the desired end. A detailed analysis of the results and the empirical nature of the tests suggested that this end might be accomplished by placing emphasis on the adoption of and the adherence to the methods of the five serologists, Eagle, Hinton, Kahn, Kline and Kolmer. By

emphasizing these methods it was thought that the use of outmoded, unworthy, or inferior personal methods could be indirectly discouraged.

A hasty and incomplete analysis of this plan might seem to discourage research for better methods, to censure some highly commendable methods or serologists and to make the control methods appear as the ultimate in serology.

However, the casual student of serology is impressed (even frequently overawed) by the empirical nature of any and all tests. The successful serologist recognizes this fact, acts accordingly and hopes that he will live long enough to know the "whys and wherefores" of the components, mechanics and physical conditions which control the present-day set-up. That trial and error processes are responsible, to an almost unlimited extent, for present systems of serologic technic rests solely on the lack of definite information concerning the nature of the test components. This is obviously admitted in the terminology and nomenclature in use.

What is an antigen? The substance producing an antibody? But what is an antibody and are the lipoidal extracts, the so-called antigens in serology, amenable to this definition? That is a widely debated question, the solution of which probably awaits the growth of *Spirochaeta pallida* in pure culture. Run through the list—reagin reacts, hemolysin hemolyses, complement completes, antigen plus reagin or antibody fix, deviate, destroy, or just what do they do to complement? There are theories, explanations and mere guesses, none fully credited at this time.

Then consider the rules of procedure. Inactivate at 55°, 56°, 60° or 62° for 3 minutes, 10 minutes, 20 minutes, or 30 minutes. Mix .85% or .9% saline, buffered with this salt or some other salt. Dilute at room temperature, at icebox temperature, at 35°. Fix one hour, 4 hours, or overnight. Perform a given step one way for a given technic. Do another technic—the results are worthless if the step is not done in the exact reverse. All of which indicates that to do good serology consistently and repeatedly, the worker must regiment his acts.

Any one technic could have been controlled in any one given place, but uniformity of results obtained in Texas and North

Dakota, in New York and California, could be achieved only by the several groups of serologists adopting and adhering to the empirical rules prescribed by the originators. They are thought to be optimum and at least have been tried against the diverse clinical material necessary to establish their intrinsic trustworthiness.

The results of the interstate evaluation studies of 1938 and 1939 justified the emphasis on standardization. The serologists were cooperative; they used the suggested methods according to the latest publications available to them. The level of efficiency became higher and the widely scattered results more uniform.

During this period of publicizing and popularizing a restricted number of serologic methods, one fact presented itself in a most gratifying fashion. Everywhere the technical workers were found to be eager to accept constructive suggestions which promised improvement in their work. They displayed complete willingness to regiment themselves and were unsparing of themselves in seeking sources of information which would aid them and their institutions in meeting the standards evolved by the committee. Simultaneously with this refreshing observation appeared another, but not such a satisfying one.

The technical worker did not have access to the latest developments in the field of serology. Many factors were instrumental in impeding immediate availability of changes in technic. The author serologists were sometimes remiss in publishing details which had long since been adopted within their own laboratory. Periodicals were delaying publication so that the interval between the discovery and putting into practice was far too long. But more serious than either of these was the fact that many serologists could not avail themselves of the changes even months or years after their publication. Inadequate library facilities and an overcrowded routine contributed to this.

These two observations indicated that a real accomplishment might take place if training facilities could be arranged for the earnest serologists. The efforts of the committee were then exerted to this end and training facilities were opened up in the laboratories of Drs. Eagle, Hinton, Kahn, Kline and Kolmer, and in the Venereal Disease Research Laboratory of the Public Health Service. The

response to the training program was almost too much for the training facilities, but the results of that plan have justified the efforts of both trainees and trainers. They have demonstrated the need for extending similar opportunities to all workers in the field of serology and the willingness of the workers themselves to take full advantage of the offer.

1940 Survey

The evaluation of efficiency of performance of serodagnostic tests for syphilis which has just been completed is striking evidence of the success of an endeavor of five years' duration. In this survey, for the first time, every State and the District of Columbia participated. One hundred and forty-one (141) test performances were reported and analyzed. There is every indication that the users of any one of the designated technics conformed in great detail to the prescribed rules and the necessary restrictions of the author serologists. It is realized that this involved reorganization, duplication of work, and long hours of labor in many laboratories. The uniformity of results obtained is reward enough for all. Today the clinician may feel assured that a Kahn result, a Kline result, a Kolmer quantitative complement-fixation result, or any other result reported under a name, is very likely to be duplicated if sent to two or more of the State laboratories using the technic in question.

However, the uniformity of these results has not been achieved at the sacrifice of efficiency. From the 36 participants who reported the results of the Kahn standard precipitation test, it is interesting to observe that the performance in Dr. Kahn's own laboratory falls into the 17th position as regards sensitivity. The percentage differences from the rating which he obtained are small and occur in almost equal numbers above and below. Among 39 complement-fixation tests which were reported, the results of Dr. Kolmer's laboratory are found to take position No. 20 in order of sensitivity. As with the Kahn, the differences are small enough to be within the range of mechanical error or more probably within the range of fallibility inherent in the test procedure itself. The results of the Eagle flocculation tests, the Hinton flocculation tests and the Eagle complement-fixation tests are similar to those just mentioned, but the participants using these methods are fewer in number so that the reports hardly justify a detailed analysis.

In the discussion of the national evaluation studies more emphasis has been placed on sensitivity than on specificity for two reasons. The first is that the specimens used in the determination of specificity are from completely normal nonsyphilitic individuals and the results of testing these specimens can be viewed with alarm if any degree of nonspecificity is manifested. The second is that until 1940 doubtful results reported on these specimens were not considered as evidence of weaknesses in the specificity of a test procedure and were not penalized in determining the specificity rating. This year a doubtful result is receiving one-half the penalty of a positive one. The reception of this change and its effect upon the entire program must be evaluated before it becomes a fixed part of the rating system. However, from the general level of specificity obtained by the testing of completely normal donors, it is obvious that few laboratories are operating in the danger zone.

The Growth of Evaluation Efforts

The work of the Committee on the Evaluation of Serodiagnostic Tests for Syphilis has been primarily concerned with the State laboratories. Other serodiagnostic laboratories have sought assistance and, in order to meet the demands throughout the country, the evaluation studies have been extended through the directorial efforts of the State laboratories themselves. Probably more than half the States have conducted, or are now conducting, intrastate evaluation studies, an outcome which was only partially foreseen five years ago.

Simultaneous with the extension of the survey work has been the aroused interest in the preparation of standard test components, particularly antigens. The use of locally prepared antigens which have not received the approval of the author serologists, or someone acceptable to them, is being discouraged. Most of the State laboratories have arranged to titrate antigen preparations submitted to them by the local and municipal laboratories. Responsibility for approving complement and hemolysin has also been accepted by the laboratories of the author serologists, by the State laboratories and other central institutions, so that several of the pitfalls of serology are being removed. The recent innovation of preserving dehydrated complement will, it is believed, contribute greatly to the stability of complement-fixation procedures.

Meeting the need for basic training, for review courses and for supervised experience in practical serology is now one of the most important phases of the national program. The author serologists are considering the formation of plans for extending consultation services in addition to their present training courses. State laboratories are rapidly assuming the position of instructors to the serologists within their boundaries. The Public Health Service is continuing to give assistance through the Venereal Disease Research Laboratory and more recently through the branch of the laboratory which has been opened in San Francisco. Additional branches may be opened if the need is great enough.

Meanwhile there are a number of research projects under way, the results of which, it is hoped, will facilitate the conduct of evaluation studies, making it possible to carry them out at frequent intervals and to include in them a range of specimens which will more accurately determine both sensitivity and specificity, as well as offer a more efficient gauge as to the precision of mechanical control with which the various tests are performed. Research problems concerning the nature of the so-called lipoidal antigens and the reagin, the elucidation of the precipitation and complement-fixation reactions, the possibility of developing a true spirochetal antigen and other basic phenomena pertaining to serology, are being pursued.

Discussion

The description and laudatory enumeration of the achievements of five years of effort toward improving the laboratory diagnosis of syphilis present only part of the picture. There are weaknesses, plenty of room for criticism and many vulnerable spots in the initial plan and in the added elements to that plan.

The several evaluation studies have been repeatedly criticized because they have accepted the performances of the author serologists as the standard by which all other laboratory performances are measured. The criticisms are theoretically justified, but from a practical viewpoint it does not seem that there is any other satisfactory criterion to use in a cooperative effort which must cover more than 100 test performances. The truth is that a more accurate measurement of the reactivity of any one specimen would be the majority report from all users of any one given technic. Such

a scheme is not practical when 350 specimens must be analyzed. It has been suggested, also, that the majority report from the control serologists should be used to establish the seroreactivity of the specimens. However, it is not believed that this is even theoretically accurate, since it is recognized that some sera are definitely positive for complement-fixation tests and only weakly so, or even negative, by some of the flocculation group. Discrepant results are fairly common findings among the various flocculation tests themselves. The differences in reactivity in the various test procedures by many specimens renders a composite standard from control laboratories a questionable basis for comparison.

The specificity of any serodiagnostic test can be defined by its ability to react only with the reagin caused by the syphilitic infection. To be truly specific the reaction must not take place with any other component of sera or spinal fluid which may be a naturally-occurring or a disease-produced factor. It would be highly desirable to use a variety of nonsyphilitic donors in arriving at specificity ratings, but the consideration of collecting approximately 300 c.c. of blood from each donor makes such a background impractical. It is for this reason that there was held in 1934, and that there will probably be held in the near future, a survey for determining the sensitivity and particularly the specificity of original methods. For these surveys many types of nonsyphilitic donors are used and from the specificity ratings obtained from the testing of this diverse group, control methods are chosen for the general evaluation studies.

It is recognized that the percentage positives which are found by the performance of any test technic may not reflect adherence to a standard procedure. Attention has been focused on this phase during recent years by presenting to the participants a table which shows the percentage agreement and disagreement with the control performances. There is little evidence that any concentrated effort has been made to bring about the type of precision control which will result in closer agreement. It is believed that the laboratories themselves will demand that a system of penalties be arranged for cases of extreme disagreement.

Conclusion

The aims of the Committee on the Evaluation of Serodiagnostic

Tests for Syphilis have met with a fair degree of success. Increased efficiency in the performance of, and greater uniformity in the results of laboratory work have been achieved. Experience in the operation of the plans already in effect and of developments which must in reason take place from time to time, will counteract the recognized defects in the present system. Accepting the criticisms with the accomplishments, the results of the five years are ample reward for the effort expended, results which have been made possible through the eager and willing cooperation of the technical serologists throughout the United States.

TOXICOLOGY IN THE HOSPITAL LABORATORY*

By A. V. ST. GEORGE, M.D.

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For many years laboratory examinations for poisonous substances found in the body or its excretions, if made at all, consisted in recovering lead, arsenic and mercury from the urine. Following the last World War, and rather suddenly, a whole list of complex organic products were sought for, both in the body or in its secretions or excretions, and were rapidly added to the routine of hospital laboratories. At this time such tests are even carried out during the administration of some highly potent (potentially toxic) therapeutic products—I refer to sulfanilamide and related compounds. Such a change was brought about in part by the introduction of numerous, often toxic, synthetic or coal-tar products. One need but refer to the whole series of phenobarbital compounds. New or improved processes or products in industry account for another part of this advancement. The whole line of newer volatile solvents is an excellent illustration. This resulted in a great many demands made on the biochemist often for very delicate and complicated tests. Today the chemist must be acquainted with the technic of these tests, what secretion, excretion, organ or tissue is best suited in the search for a given poison, and often the clinical value of his findings. Even given all this knowledge the chemist is still not in a position to qualify as a toxicologist in court. I emphasize this point because the life or death of a defendant often hinges solely on a toxicologist's testimony. A person performing toxicological tests in a hospital laboratory should confine himself to reporting or recording his findings. If he subsequently wishes to qualify as a toxicologist he must study and become intimately acquainted with the extensive literature and technic of toxicology. Only thus can he avoid the

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numerous pitfalls which he will encounter, often with embarrassment to himself, in a public court-room.

Now let us turn to that group of men who utilize the hospital laboratory to its most productive extent, and are in the last analysis the source of all laboratory specimens, I refer to the attending clinician. Just to what extent is he affected, aided or interested in the toxicological reports of his hospital laboratory and when are such findings almost indispensable to him?

Poisoning may result through criminal or suicidal intent, or through accident. Those involved through accident are primarily major industrial problems to be referred to later.

The duties of the physician in cases of poisoning are twofold: to save life or suffering and to aid justice. The former object requires the removal of the poison, the administration of antidotes and the treatment of symptoms. In a great many of these cases, the patient is in coma, no history of the drug consumed is available and rapid diagnosis, including laboratory examination to determine the type of coma, is attempted. In order to graphically present our difficulty and the role the toxicological aspect plays, I will give a facile classification of causes of coma—which number five:

1. Alcohol, apoplexy and asphyxia (carbon monoxide)
2. Epileptic stupor
3. Injury—head, shock from any cause
4. Opium and related drugs
5. Uremia and diabetic coma.

As is obvious, drugs constitute one of the five causes. Rapid diagnosis and treatment are paramount since a few of the more deadly poisons may be counteracted by specifics if the injurious agent is identified before fatal results ensue. The simpler the test, the more rapid and satisfactory the conduct of the case becomes. For instance, some drugs impart a characteristic color to urine, but the story is not often as simple as this. Usually, specimens of blood and gastric content are also obtained and then the problem is one of analysis. To be sure, physical examination might eliminate certain drugs; current drug fads often give a clue. Still the problem is a difficult one for the toxicologist. In 1916, perhaps 5/6ths of all suicidal deaths were due to phenol, the fashion of that time. The

urine in these cases becomes olive-green to brownish-black upon standing. Today, however, the suicide rate due to barbiturate poisoning is rapidly rising and had reached such alarming proportions 3 ears ago that, at a meeting of the A. M. A. in June, 1937, a resolution was introduced on the "evils from the promiscuous use of barbituric acid and derivative drugs" in which was included the following statement: "The evils of these drugs include habit formation, toxic cumulative action, their substitution for alcoholic beverages for drunken eposides and, last but not least, their use for suicidal attempts, their improper use being a recognized causative factor in many motor accidents and their improper use being a recognized etiologic factor in some criminal assaults."

1. More than 1,200,000,000 grains of barbituric acid derivatives were sold in the U. S. in 1936.
2. Total number of suicidal deaths by barbiturates in 1936 was close to 300.
3. For the past 5 years (1932-37) the national incidence of suicides by barbiturates represents 4.2% of all poisons and 0.66% of all methods used for suicide.
4. Number of suicides by barbiturates has shown a definite upward trend during the past decade while frequency of suicide by liquid and solid poisons has declined.

Thus we see that this problem is of vast economic and social significance as well as a medical problem. In cases of chronic poisoning, various afflictions of the nervous system, which present a similar picture, have to be ruled out. Chemical tests by the toxicologist for identification of poisons (the barbiturates for example) in the urine and blood have to be simple and yet accurate to obtain results.

Another important cause of coma is the excessive use of alcohol, but in this case, the odor of the breath is sometimes, but not always, a valuable aid. Aside from the problem of acute alcoholism, and the difficulty in differentiating this condition from a host of other catastrophes, poisoning by alcohol has become an important medico-legal question, particularly in reference to the operation of motor vehicles by persons under the influence of alcohol. Once more the laboratory has stepped forward with an important contribution,

namely, testing the alcoholic content of the blood which is an exact determination as contrasted with a police officer's idea as to what the criteria of alcoholic intoxication are. Also, the economic liability incorporated in widespread chronic alcoholism with subsequent degeneration of the nervous system isn't to be taken lightly. Wood or methyl alcohol, a highly toxic product and closely allied to ordinary alcohol in structure, is now more related to industrial poisonings, though in by-gone days its substitution in drinks in place of ethyl alcohol generally, through ignorance, produced a host of poisonings, blindness and death. Methyl alcohol was catapulted into much prominence in the post war era of prohibition when alcoholics imbibed this liquor and widespread incurable blindness from retrobulbar neuritis and retinitis and optic nerve atrophy was precipitated. Commercially, it is used extensively in the arts (as a combustible solvent for shellac, etc.) and as an adulterant of alcoholic beverages and medicines. Whenever two or three compound cathartic tablets do not produce catharsis in an intoxicated patient, methyl alcohol poisoning is to be suspected and evacuation can only be obtained with the use of castor oil.

One of the greatest triumphs of modern medicine was the discovery of a specific cure for syphilis; namely, salvarsan in its many modified forms and variegated compounds. This metal or drug has also been used in numerous other medical conditions with varying success. Regardless of its use, it must be given with extreme caution as its reactions may be of a lethal nature, particularly its destructive effect upon the liver. Tests should be made at all times in order to safeguard the patient. Arsenic, as is the case with most of the heavy metals, can be used with deadly effect as a poison in large doses and this must be borne in mind.

The next point of interest relates to the industrial hazards engendered during the manufacture of certain products. The most important of these chronic poisonings is lead, while the most interesting concerns the group of benzol derivatives. Two other heavy metals are important and of interest, namely, mercury and radium. Finally, carbon monoxide merits attention because of numerous catastrophes.

Ever since lead has been used in industry and the arts, lead poisoning has been a well-known occupational disease. The disease

is usually associated with the inhalation of the dust of lead or of its compounds, and with the ingestion of contaminated foods and liquids. Although lead poisoning is still the most important of all industrial diseases, the relative frequency of occurrence is far lower than it was fifteen years ago. The recent work of Oliver and Legge in England and of Alice Hamilton in this country has proved prevention is possible and as a result of the legislation and factory improvement incited by their investigations, the number of cases is rapidly declining. About 150 industries involve some exposure to lead and only the most important will be cited as anything beyond that is merely pedantic.

The dusty trades are the most hazardous and include the manufacture of white and red lead, of storage batteries, and of pottery as well as painting, printing and the mixing of rubber.

Outside of industry, lead poisoning is infrequent. Recently, the preparation by amateurs of wines and liquors in vessels which contain lead alloys has caused some plumbism in the U. S. Other less frequent causes are the drinking of rather acid water in which lead pipe has been immersed, the use of hair dyes or cosmetics, children playing with painted objects, frequently biting and licking them, etc. The history, if carefully taken, together with proper laboratory data, sometimes render a difficult diagnosis of plumbism fairly simple. This disease affects the blood, gastro-intestinal tract and nervous system primarily.

Next, to my mind, the most interesting group of commercial poisons, are those of benzene and its derivatives. Benzene is obtained by the distillation of coal and the cracking of certain grades of petroleum. It is now widely used in the manufacture of rubber goods and artificial leather; in lacquers, paints and motor fuels; and for a great variety of other purposes such as dyes, in the cleaning industry, etc. Benzene poisoning is usually caused by inhalation of its vapor though it can be produced by skin absorption. Fifteen parts of benzene in 1,000,000 parts of air, may produce some effects and this concentration is frequently below that encountered in industry; it is now held that 100 parts in a 1,000,000 should not be exceeded.

When one of its products, coal-tar or crude paraffin comes into

contact with the skin of workers, chronic dermatitis, eczema, eruptions and papillomata which may turn into true cancer result.

Another fact of intense interest is a very high incidence of tissue growth and cancers of the urinary bladder noted in workers employed in the manufacture of some aniline dyes. An estimated incidence is as high as 1:500, tumors being discovered $\frac{1}{2}$ to 28 years after starting the employment.

Other benzene products are trinitrotoluol, coal-tar dyes, creosote, carbolic acid, phenolphthalein and related dyes.

The last of the heavy metals to be discussed as etiologic factors in connection with industrial hazards, and in addition as medical therapeutic agents, are mercury and radium salts. Mercury has long been employed in the arts and medicine. Paracelsus advocated its use in the treatment of syphilis in 1515. Bichloride of mercury is well-known in the role of acute mercurial poisoning whether accidental or suicidal. The third phase of mercurial activity is that of industrial poisoning which is almost invariably a chronic intoxication resulting from the inhalation of volatilized mercury over a long period. The hazardous trades are the production of mercury and its derivatives, the manufacture of scientific instruments, the preparation of hatters fur and felt hat makings, the extraction of gold and silver by amalgamation and the preparation and handling of the fulminate of mercury used as a detonator of explosives. Mercury affects primarily the kidneys and the central nervous system.

The term radium poisoning should be confined to the harmful effects caused by absorption of small amounts of radium or other radio-active substances. It must not be confused with the deleterious effects, now rarely seen, of x-rays or of radium emanations applied in the treatment of cancer or other conditions. The possibility of poisoning by ingestion, inhalation and intravenous injection of radio-active substances wasn't recognized until the occurrence in 1925 of several deaths among girls who had swallowed radium paint while "pointing" their brushes during the painting of luminous watch-dials in a plant ten or more years earlier. Its recognition and adoption of preventive measures has practically eliminated radium poisoning as an industrial hazard. Another less frequent cause is the drinking of water containing radio-active salts in solution.

The next substance differs materially from the above in that it is a gas, known to us all as carbon monoxide which is of considerable toxicological importance through its occurrence in illuminating gas. Without doubt, countless persons are affected daily to some extent by this gas which is unqualifiedly the most widely distributed of toxic agents. Some of its deadliness is accounted for by its being colorless, in ordinary concentrations odorless, and is slightly lighter than air. It has an affinity for hemoglobin, two to three hundred times greater than that of oxygen; thus the only cure for poisoning is artificial respiration together with rich mixtures of oxygen and carbon dioxide. The gas is encountered in many industries, such as coal mining, in the steel industry, in processes utilizing gas heat and also in the exhaust of combustion engines. Absolute diagnosis of intoxication with this gas is dependent on the identification of carbon monoxide hemoglobin in blood, which imparts a bright scarlet red tint to the blood which is manifested through cherry-red lips, or cherry-red skin, etc.

Thus we see that the toxicological division of the hospital laboratory occupies an indispensable position concerning the rapid diagnosis and effective treatment of acute poisoning and also in the preventive aspects of chronic poisoning and intoxication as was readily demonstrated in industry and the arts. I can hardly over-emphasize the preventive aspect of the poisonous effects of various commercial intoxicant products of industry, applying both to the trade workers engaged in their preparation and to the consumer. Upon the toxicologist also falls the task of constantly searching for more effective specific antidotes for all types of poisoning. He is also the individual who keeps the clinician aware of the advances made in toxicology, suggests improvement in routine and emergency therapy, and actively participates in securing effective legislation designed to protect all against industrial and accidental hazards.

The final role of the toxicologist and one of utmost importance to his professional brethren, is to aid the clinician in his conduct of a case of poisoning, primarily from the legal standpoint. For the detection of poison and to aid in fixing the guilt on the proper person, the physician must be advised, not only to carefully observe the symptoms and take body fluids or specimens for examination, but

take possession of any suspected material, medicine, etc., and in case of autopsy, preserve the stomach and its contents, the intestines and contents, blood, liver, kidneys and portions of other organs separately, without antiseptics, in clean hermetically sealed glass vessels, which should be sealed with wax. An exact written record of all the observations should be made as soon as possible. Thus, the ordinary clinician, being foreign to the routine, procedure and stirring drama sometimes unfolding before his eyes in such cases, can well use the experience and advice of the expert. The symptoms of suspected poisoning are rarely sufficient to affirm the presence or nature of a poison, although they may be of great aid to the analyst. The final proof rests generally on the results of chemical examination. So much depends on this analysis that it should never be undertaken by one who has not had extensive experience in this work and who has not the necessary facilities. It generally lies entirely out of the scope of the physician, as well as the average medical technician. The latter should, however, be familiar with the general outline of the process used for isolating poisons, and with such chemical tests as may be quickly applied. These tests, as discussed above, are valuable for diagnostic and therapeutic purposes. The physician or chemist is often expected to give expert testimony on toxicologic questions and, to do this intelligently, he must at least have an elementary knowledge of toxicological analyses.

INCIDENCE OF INTESTINAL PARASITES*

By HERMINE TATE, M.T.

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All of you are familiar with Longfellow's poem "Evangeline," as to how the Arcadians were driven from their homes in Nova Scotia, and were scattered throughout the eastern states. Some of them wandered way down into what is now Southwest Louisiana, and settled along the bayous. However this has been over two centuries ago. These peace loving people in their beautiful Tech country with huge moss covered oaks and flowers blooming the year round, still cling to their native tongue, customs and religion. Today you will find the poor and more illiterate class living in little huts in the swamps and along the bayous. They speak only French, or rather a dialect of it. Their chief occupations are fishing and truck farming. The higher educated and more progressive class have built the towns and small cities in this section of Louisiana. But they too cling to the friendly tradition and practice that true southern hospitality (the kind one reads about but seldom sees).

Numerous studies of incidence of intestinal parasites have been made from various sections of Louisiana and the United States. But to my knowledge this is the first study made from this "Evangeline" section of Louisiana which covers an area of several parishes. You frequently find such studies coming from institutions which admit only charity patients, or from charity out-patient clinics, all of whom may be assumed to belong to the same social stratum. After discussing this subject with doctors and other laboratorians in this vicinity who are connected with private sanatoria and clinics, I am quite confident that had this same study been made on the more prosperous class of people residing in this district, whose living conditions are higher, the figures would be quite different from these found in our laboratories at Lafayette Charity Hospital.

* Read before the American Society of Medical Technologists, New York City, June, 1940.

Out of this series of stool examinations made on 1,400 patients who were admitted into our Charity Hospital for medical, surgical or obstetrical cares, we have 819 or 58.50% positive findings. Less than 1% of these could be termed as selected cases, that is, patients who were admitted with a diagnosis or for treatment of intestinal parasites. Numerous children were admitted into the hospital for tonsillectomys, and by the laboratory doing a routine fecal examination, we found an alarmingly large percent of the children to be infected with from one to three species of intestinal parasites.

I would like for you to peep into our records on routine examination for just a moment, and note some of these most interesting and unusual cases pertaining to intestinal parasites. A colored male, thirty-five years of age, was admitted with the diagnosis of acute conjunctivitis. The patient gave no history of any type of intestinal parasites. However, a routine fecal examination revealed the ova of tape worm. After *Oleoresin Aspidium* was given, the patient then gave us twenty-five feet of *Taenia saginata* with the head attached. A child, nine years of age, came into the orthopedic ward with a stubborn sore on his leg, chronic osteomyelitis was suspected, X-ray pictures showed no bone pathology, but a routine fecal examination showed *Necator americanus*. A baby, one year and two months of age, came into the hospital in a most critical condition suffering from pneumonia. Fecal examination showed infections of *Necator americanus*, *Trichocephalus trichiurus*, *Ascaris lumbricoides*, and *Endameba histolytica* cysts.

The microscopic study of a stool may be made a very easy procedure or a complicated one, consuming too much of the technician's time. A simple, yet accurate method, is to mix the specimen of stool with sufficient warm water to make a thin suspension. Filter through several thicknesses of gauze to remove the large particles of material. Pour approximately 1 c.c. of this filtered suspension in a test tube, five inches in length by one-half inch in diameter. Finish filling tube with warm water or normal saline and centrifuge 1,000 r.p.m. for thirty seconds. Decant the supernatant fluid and rewash the residue in this same manner from two to three times, so as to obtain the very thin yet concentrated material. Place a drop of this washed residue on the first and last third of the slide. Dip

one end of an applicator in iodine solution and mix thoroughly with latter drop of material on slide. Place large cover slips over both the stained and unstained preparation, which you now have on one slide. A search for parasites is made with the low power lens, using high power lens to rule out or to classify the organisms. The differentiation of cysts is usually made from the stained material. As a rule our time permitted examination of only one slide per patient on this series studied.

In this first table, consisting of fecal examinations from 1,400 individuals, we have differentiated twelve species of intestinal parasites, giving the number of appearances each make. Notice! *Trichocephalus trichiurus* wins in popularity with 23.78%. *Ascaris lumbricoides* is running a close race with 23.64%, *Necator americanus* having been found to infect 3.42% of these patients, while *Taenia saginata* runs up to nearly 1%. And we find *Oxyuris vermicularis* appearing least in frequency.

TABLE I

TOTAL NUMBER OF APPEARANCES

| | No. | Absolute % |
|--|-----|------------|
| <i>Trichocephalus trichiurus</i> | 333 | 23.78 |
| <i>Ascaris lumbricoides</i> | 331 | 23.64 |
| <i>Endameba coli</i> cysts..... | 272 | 19.42 |
| <i>Strongyloides larva</i> | 135 | 9.64 |
| <i>Necator americanus</i> | 49 | 3.42 |
| <i>Endameba histolytica</i> cysts..... | 46 | 3.28 |
| <i>Trichomona</i> | 37 | 2.64 |
| <i>Endolimax nana</i> cysts..... | 20 | 1.42 |
| <i>Taenia saginata</i> | 13 | .928 |
| <i>Hymenolepis nana</i> | 7 | .500 |
| <i>Iodamoeba butchilii</i> | 6 | .428 |
| <i>Oxyuris vermicularis</i> | 3 | .214 |

Now that we have the popularity of each parasite fixed, the next table will show the frequency in which these parasites appear singu-

larly in each individual. Table II shows 565 patients being infected with one species of parasites. *Ascaris lumbricoides* comes first in individuality numbering 203, and *Trichocephalus trichiurus* is running second with just 135. Special notice in this table of individuality, that differs from the first one in popularity, is that *Taenia saginata* has moved up from the ninth row to the seventh row, and that this table has claimed twelve out of her thirteen appearances. Yet the dwarf tape worm appears only twice in this table of single infections.

TABLE II
SINGLE INFECTIONS OF PARASITES

| | No. | Absolute % | Relative % |
|--|-----|------------|------------|
| <i>Ascaris lumbricoides</i> | 203 | 14.50 | 24.79 |
| <i>Trichocephalus trichiurus</i> | 135 | 9.64 | 23.89 |
| <i>Strongyloides larva</i> | 82 | 5.85 | 10.01 |
| <i>Endameba coli</i> cysts..... | 68 | 4.85 | 8.30 |
| <i>Necator americanus</i> | 29 | 2.07 | 3.54 |
| <i>Trichomona</i> | 16 | 1.14 | 1.95 |
| <i>Taenia saginata</i> | 12 | .857 | 1.46 |
| <i>Endameba histolytica</i> cysts..... | 10 | .814 | 1.22 |
| <i>Endolimax nana</i> cysts..... | 5 | .358 | .610 |
| <i>Oxyuris vermicularis</i> | 3 | .214 | .366 |
| <i>Hymenolepis nana</i> | 2 | .142 | .244 |
| Total | 565 | | |

In this third table we find twenty different combinations of the double infection, which was present in 188 of our patients from this series studied. Our two populars, *Ascaris lumbricoides* and *Trichocephalus trichiurus*, have combined and are still leading. The one remaining appearance of *Taenia saginata* is found here and in the presence of *Trichocephalus trichiurus*.

TABLE III
DOUBLE INFECTIONS

| | No. | Absolute % | Relative % |
|--|-----|------------|------------|
| <i>Ascaris lumbricoides</i> and <i>Trichocephalus trichiurus</i> | 64 | 4.57 | 7.81 |
| <i>Trichocephalus trichiurus</i> and <i>Endameba coli</i> cysts | 37 | 2.64 | 4.52 |
| <i>Trichocephalus trichiurus</i> and <i>Strongyloides</i> larva | 13 | .928 | 1.59 |
| <i>Endameba coli</i> cysts and <i>Endameba histolytica</i> cysts | 10 | .714 | 1.22 |
| <i>Ascaris lumbricoides</i> and <i>Trichomona</i> | 10 | .714 | 1.22 |
| <i>Ascaris lumbricoides</i> and <i>Endameba coli</i> cysts | 9 | .642 | 1.10 |
| <i>Necator americanus</i> and <i>Endameba histolytica</i> cysts | 5 | .357 | .610 |
| <i>Hymenolepis nana</i> and <i>Strongyloides</i> larva.. | 5 | .357 | .610 |
| <i>Necator americanus</i> and <i>Trichocephalus trichiurus</i> | 4 | .285 | .488 |
| <i>Trichocephalus trichiurus</i> and <i>Endolimax nana</i> | 4 | .285 | .488 |
| <i>Necator americanus</i> and <i>Trichomona</i> | 4 | .285 | .488 |
| <i>Trichocephalus trichiurus</i> and <i>Trichomona</i> .. | 4 | .285 | .488 |
| <i>Ascaris lumbricoides</i> and <i>Endameba histolytica</i> cysts | 4 | .285 | .488 |
| <i>Necator americanus</i> and <i>Endameba coli</i> cysts | 3 | .214 | .366 |
| <i>Trichocephalus trichiurus</i> and <i>Endameba histolytica</i> cysts | 3 | .214 | .366 |
| <i>Endolimax nana</i> cysts and <i>Endameba histolytica</i> cysts | 2 | .142 | .244 |
| <i>Strongyloides</i> larva and <i>Iodamoeba buetschlii</i> | 2 | .142 | .244 |
| <i>Endolimax nana</i> and <i>Endameba coli</i> cysts.. | 2 | .142 | .244 |
| <i>Strongyloides</i> larva and <i>Endameba coli</i> cysts | 2 | .142 | .244 |
| <i>Taenia saginata</i> and <i>Trichocephalus trichiurus</i> | 1 | .071 | .22 |
| Total | 188 | | |

Our fourth table deals with triple infections. Here we find ten different combinations from fifty-eight individuals. *Trichocephalus trichiurus*, *Ascaris lumbricoides* and *Endameba coli* cysts being the

most frequent combinations. With *Trichocephalus*, *Ascaris* and *Strongyloides* running a close second. Note the combinations on lines six and ten, consisting of cysts alone.

TABLE IV
TRIPLE INFECTIONS

| | No. | Absolute % | Relative % |
|--|-----|------------|------------|
| <i>Trichocephalus trichiurus</i> , <i>Ascaris lumbricoides</i> and <i>Endameba coli</i> cysts..... | 13 | .928 | 1.59 |
| <i>Trichocephalus trichiurus</i> , <i>Ascaris lumbricoides</i> and <i>Strongyloides larva</i> | 11 | .785 | 1.34 |
| <i>Trichocephalus trichiurus</i> , <i>Strongyloides larva</i> and <i>Endameba coli</i> cysts..... | 9 | .642 | 1.10 |
| <i>Ascaris lumbricoides</i> , <i>Strongyloides larva</i> and <i>Endameba coli</i> cysts..... | 5 | .357 | .610 |
| <i>Ascaris lumbricoides</i> , <i>Trichocephalus trichiurus</i> and <i>Endolimax nana</i> | 4 | .285 | .488 |
| <i>Iodamoeba butschlii</i> , <i>Endolimax nana</i> and <i>Endameba histolytica</i> cysts..... | 4 | .285 | .488 |
| <i>Trichocephalus trichiurus</i> , <i>Endameba coli</i> cysts and <i>Endameba histolytica</i> cysts... | 4 | .285 | .488 |
| <i>Necator americanus</i> , <i>Trichocephalus trichiurus</i> and <i>Strongyloides larva</i> | 3 | .214 | .366 |
| <i>Ascaris lumbricoides</i> , <i>Endolimax nana</i> and <i>Endameba coli</i> cysts..... | 3 | .214 | .366 |
| <i>Endolimax nana</i> , <i>Endameba histolytica</i> cysts and <i>Endameba coli</i> cysts..... | 2 | .142 | .244 |
| Total | 58 | | |

From table five we find the least in frequency yet the most in variety. Eight individuals are found to be carrying a quadruple infection shown in five different combinations. Incidentally, the specimens from which we obtained the combination on lines four and five, were searched repeatedly for *Endameba coli* cysts, or some of our other common species, because we wanted to find a quintuplet infection. As my search was in vain the number of species found per individual had to stop at four.

TABLE V
QUADRUPLE INFECTIONS

| | No. | Absolute % | Relative % |
|--|-----|------------|------------|
| Trichocephalus trichiurus, Strongyloides larva, Endolimax nana and Endameba coli cysts | 2 | .142 | .244 |
| Trichocephalus trichiurus, Ascaris lumbricoides, Endameba coli cysts and Endameba histolytica cysts..... | 2 | .142 | .244 |
| Ascaris lumbricoides, Trichocephalus trichiurus, Trichomona and Necator americanus | 2 | .142 | .244 |
| Ascaris lumbricoides, Trichocephalus, Endameba coli cysts and Necator americanus | 1 | .971 | .122 |
| Ascaris lumbricoides, Trichocephalus trichiurus, Strongyloides larva and Trichomona | 1 | .971 | .122 |
| Total | 8 | | |

Table six, which is divided into four parts, gives the summary of the infections relative to the number of species of parasites and to the patient's diagnosis on admission.

Group A

Patients on the surgical service who are infected with one species of intestinal parasites lead with 280. Medical service comes next with 237, then obstetrical with 48.

TABLE VI
GROUP A—SINGLE INFECTIONS

| | No. | Absolute % | Relative % |
|-------------------------|-----|------------|------------|
| Surgical cases | 280 | 20 | 34.18 |
| Medical cases | 237 | 16.92 | 28.93 |
| Obstetrical cases | 48 | 3.42 | 5.98 |
| Total | 565 | | |

Group B

This gives the classification as to diagnosis from patients having been found with a double infection. Surgical patients are still leading; medical, next; then obstetrical.

GROUP B—DOUBLE INFECTIONS

| | No. | Absolute % | Relative % |
|-------------------------|-----|------------|------------|
| Surgical cases | 110 | 7.85 | 13.40 |
| Medical cases | 66 | 4.71 | 8.06 |
| Obstetrical cases | 12 | .857 | 1.46 |
| Total | 188 | | |

Group C

Here we have the triple infection which differs from the single infection found in "A" and the double infection found in "B", in that the medical cases are in the majority over the surgical cases, and no obstetrical cases are found.

GROUP C—TRIPLE INFECTIONS

| | No. | Absolute % | Relative % |
|-------------------------|-----|------------|------------|
| Surgical cases | 23 | 1.64 | 2.81 |
| Medical cases | 35 | 2.50 | 4.27 |
| Obstetrical cases | 0 | | |
| Total | 58 | | |

Group D

The grouping here is quite different from that which is found in "A", "B" and "C". The eight individuals carrying the quadruple infections are all from the medical wards.

GROUP D—QUADRUPLE INFECTIONS

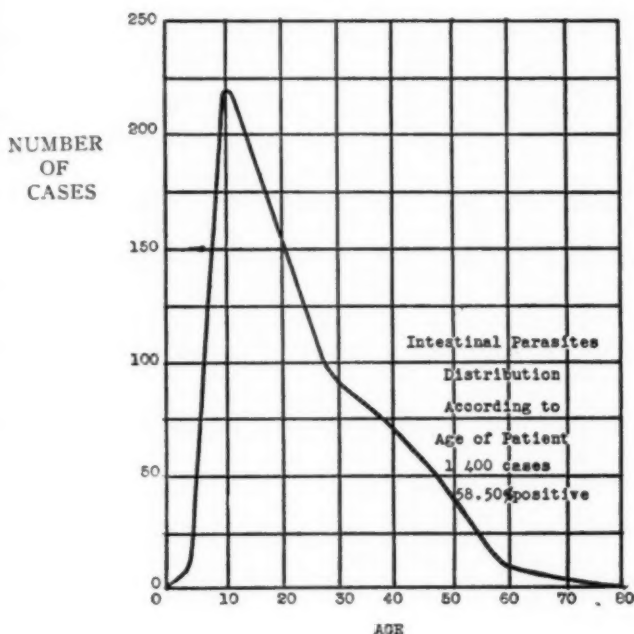
| | No. | Absolute % | Relative % |
|-------------------------|-----|------------|------------|
| Surgical cases | 0 | | |
| Medical cases | 8 | .571 | .976 |
| Obstetrical cases | 0 | | |

Table seven gives the race and sex distribution of our 819 individuals that were found to be infected with the various species of intestinal parasites. Note colored females lead; white males second; white females third; and colored males fourth in frequency.

TABLE VII
RACE AND SEX DISTRIBUTION

| | No. | Absolute % | Relative % |
|-----------------------|-----|------------|------------|
| Colored females | 229 | 16.37 | 27.96 |
| White males | 215 | 15.35 | 26.25 |
| White females | 200 | 14.28 | 24.42 |
| Colored males | 175 | 12.50 | 21.34 |

TABLE VIII



This graph finds the age distribution of our infected patients, showing that the most popular ages for intestinal parasites are from 5 to 10 years; then 10 to 15 years; next, 15 to 20 years, and on up the line. Notice: We find the same number of parasites from 1 to 5 years as we do from 45 to 60 years.

Summary and Conclusion

A study is made on fecal material from 1,400 individuals who were admitted into Lafayette Charity Hospital, finding a positive percentage of 58.50. A classification is made for single, double, triple and quadruple infections. Patients are also classified according to diagnosis on admission and to race, sex and age distribution.

While the experienced clinician may recognize characteristic physical signs and symptoms of some of the intestinal parasites, there is only one certain guarantee of specific diagnosis, namely the identification of the organism or its products from the body excreta, fluid or lesions. Fortunate is the hospital or clinic, and more fortunate is the patient, where routine fecal examinations are made without exception.

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ABSTRACTS

INTERPRETATION OF BLOOD SUGAR FIGURES: H. J. John, *Ohio State Med. Jr.*, vol. 36, No. 5, May, '40, p. 527.

Dr. John advocates making blood sugar determination 2½ hours after a heavy carbohydrate meal rather than in the fasting state. This would aid in detecting early diabetes in those in whom the fasting blood sugar may be normal.

THE RELIABILITY OF THE LEUKOCYTE COUNT IN THE DIAGNOSIS OF APPENDICITIS: A. S. Johnson, *New Eng. Jr. of Med.*, vol. 223, No. 10, Sept., '40, p. 373.

Using a WBC of 10,000 with polymorphonuclears 70% as the upper limits, only 60% of 221 cases gave counts indicative of the appendicial lesion found. WBC 15,000 with polys 80% or over occurred in 9% of cases found to have normal appendices. The author cautions against laying too much stress on white blood counts and poly counts.

ACUTE ASEPTIC MENINGITIS: J. G. Pasternack, *New Orleans Med. & Surg. Jr.*, vol. 93, No. 2, Aug., '40, p. 78.

Apparently there is more than one type of illness covered by this term. A virus was isolated as the causative factor in the kind designated as "lymphocytic choriomeningitis." It was found to occur among monkeys and mice and to be transmitted by mosquitoes. The onset is usually a "cold," "grippe" or some acute infectious disease. Spinal pressure may be normal or slightly increased, fluid may be clear or opalescent and rarely gives a pellicle. Cell counts may be less than 100 and all lymphocytes to 12,500 with 70% polys. Total protein may be increased. Colloidal gold may be normal or meningitic. Sugar and chlorides are not reliable especially if vomiting is present. Complement fixation tests for syphilis, smears and cultures are negative. Blood may show a minor leukocytosis on

counts up to 20,000 with an absolute lymphocytosis.

No specific laboratory method is known for those not caused by the virus of lymphocytic choriomeningitis. Complement-fixation and precipitin tests are being developed for it.

THE DECREASE OF GASTRIC SECRETION WITH ADVANCING YEARS: FURTHER OBSERVATIONS: A. L. Bloomfield, Jr. Clin. Inves., vol. 19, No. 1, Jan., '40, p. 61.

Report of a series of histamine tests repeated on the same individuals after ten or more years. Most showed little change, while in some there was a fall in gastric secretion. Determination of basal gastric secretion, however, showed a decline with advancing years.

SERUM PHOSPHATASE IN THE LYMPHOMATOID DISEASES: H. Q. Woodard and L. F. Carver, Jr. Clin. Inves., vol. 19, No. 1, Jan., '40, p. 1.

A modification of the Bodansky phosphatase method was used on a group of 115 lymphomatoid cases. High values were frequently found in Hodgkin's disease but less often in lymphosarcoma and leukemias. As these high values were frequently associated with bone symptoms or lesions, they are thought to indicate invasion of bone.

STUDIES ON THE OCCURRENCE OF THE V-FACTOR (COENZYMES I & II) IN NORMAL AND PATHOLOGICAL SPINAL FLUIDS: C. Scheer, Jr. Imm., vol. 38, No. 4, Apr., '40, p. 301.

The V-factor, required for growth of *Hemophilus influenzae* and *Hemophilus parainfluenzae*, while present in the blood and brain did not pass the blood-spinal barrier in normal adults. In some pathological conditions it did occur in the spinal fluid.

GRANULOMA RESULTING FROM PENETRATION OF TALCUM POWDER: E. De Savitsch, Med. Ann. Dist. of Col., vol. 9, No. 5, May, '40, p. 169.

Report of a case of axillary tumor following use of talcum to alleviate pressure due to a brace. Tissue revealed a subacute granuloma with irritation-type giant cells.

A SIMPLE APPARATUS FOR THE DETERMINATION OF THE SPECIFIC GRAVITY OF SMALL AMOUNTS OF FLUID: H.

Heller, Jr. *Physiol.*, vol. 93, No. 1, Mar., '40, p. 3P.

Description and diagram of an apparatus in which a single drop of the test fluid is suspended in a mixture of a heavy and a light fluid with which it is immiscible. The specific gravity of the mixed fluids is adjusted until the drop of test fluid just floats and the specific gravity of the mixed fluids is read.

THE RELATION OF METHEMOGLOBIN TO THE CYANOSIS OBSERVED AFTER SULFANILAMIDE ADMINISTRATION:

I. Vigness, C. J. Watson & W. W. Spink, Jr. *Clin. Inves.*, vol. 19, No. 1, Jan., '40, p. 83.

Blood of cyanotic patients receiving sulfanilamide was examined spectroscopically. Methemoglobin and, rarely, sulfahemoglobin were the only pigments demonstrable in sufficient concentration to cause cyanosis. Methylene blue counteracted methemoglobin but not sulfhemoglobin.

A DIFFERENTIAL STAIN FOR HAIR CELLS: I. P. J. MacNaughton & E. W. Peet, Jr. *Lar. & Otol.*, vol. 55, No. 2, Feb., '40, p. 113.

A modification of Mallory's stain using greater dilution with longer exposure.

INFECTIOUS MONONUCLEOSIS: A. Bernstein, *Medicine*, vol. 19, No. 1, Feb., '40, p. 85.

A detailed discussion incorporating recent literature and the findings in 65 sporadic cases.

HYPERTROPHIA MUSCULORUM VERA (DYSTROPHIA MUSCULORUM HYPERPLASTICA) ASSOCIATED WITH HYPOTHYROIDISM: A CASE STUDY: F. H. Hesser, *Bull. Johns Hopkins Hosp.*, vol. 66, No. 6, June, '40, p. 353.

Presentation of a case with greatly hypertrophied muscles with pain and tenderness and discussion of similar cases reported. Laboratory findings are given with the most significant deviation a B.M.R. of -28%. Administration of thyroid instigated improvement.

THE INVOLVEMENT OF THE NERVOUS SYSTEM IN SICKLE-CELL ANEMIA: J. G. Hughes, L. W. Diggs, C. E. Gillespie, Jr. *Ped.*, vol. 17, No. 2, Aug., '40, p. 166.

Reports of 6 cases of sickle-cell anemia with nervous involvement are given in detail with a review of others found in the literature. Brain lesions were multiple and widespread and similar to those of other organs. The authors believe them due to thrombosis giving rise to hemorrhagic, degenerative and atrophic changes.

THE ACTION OF SULFATHIAZOLE ON THE COLON-TYPHOID-DYSENTERIAE GROUP OF ORGANISMS: R. L. Libby and A. L. Joyner, *Jr. Inf. Dis.*, vol. 67, No. 1, July, '40, p. 67.

In vitro comparisons of the relative activity of sulfathiazole, sulfapyridine and sulfanilamide against representative organisms of various species are described. Sulfathiazole was found much more active against the colon-typhoid-dysenteriae group than either sulfanilamide or sulfapyridine.

PROPAGATION OF VACCINIA VIRUS IN THE RABBIT FETUS: F. W. Gallagher and O. C. Woolpert, *Jr. Exp. Med.*, vol. 72, No. 2, Aug., '40, p. 99.

The method is given whereby the fetuses were inoculated in utero, giving sterile incubation conditions and allowing for inoculation directly into the desired area. Virus was found in all lesions and organs which showed no lesions also yielded virus. Serial passage was carried out successfully. Titer was maintained except that strains lost their power to infect by scarification method. The suggestion is made that inoculation carried out in such highly susceptible animals allows the perpetuation of the less virulent elements which otherwise would not survive.

INFLUENZAL MENINGITIS: CASE REPORT: E. M. Sirlin, A. H. London, *Jr. Ped.*, vol. 17, No. 2, Aug., '40, p. 228.

The spinal fluid cell count was 4,800 with mostly polymorphonuclear cells. Many Gram negative rods and diplococcal forms were found in the smear. Sulfapyridine and neoprontosil effected recovery.

BOOK REVIEW

MANUAL OF CLINICAL CHEMISTRY by Miriam Reiner, M.Sc., Assistant Chemist to The Mount Sinai Hospital, New York. Introduction by Harry Sobotka, Ph.D., Chemist to The Mount Sinai Hospital, New York. 296 pages with 18 illustrations. Interscience Publishers, Inc., 215 Fourth Avenue, New York, N. Y., 1941. Cloth, \$3.00.

This convenient sized manual deals only with the technical procedures of clinical chemistry including methods for the preparation of standard solutions and some of the most frequently used tables. In general the technic that has been found the most satisfactory by the author is given and except in very few instances only one technic for any one procedure is presented. In some cases the particular modification used at The Mount Sinai Hospital is given. A complete bibliography is not included but the most recent reference is given under the title of each method. The manual is a compilation of convenient methods of clinical chemistry prepared originally by the author in syllabus form for use by internes and laboratory technicians and subsequently enlarged to include the vitamins and many functional and clinical tests. The usual blood, urine, gastric, feces and cerebrospinal fluid tests are given. Other chapters include chemotherapy determinations, liver and kidney function tests, sex hormones, antigens and others. Physicians, internes and technicians will find the manual a ready and accurate guide for conducting clinical laboratory procedures.

NEWS AND ANNOUNCEMENTS

Massachusetts Institute of Technology, Cambridge, Mass., Department of Biology and Public Health, is again offering summer courses in General Bacteriology (June 9 to June 27, 1941) and Public Health Bacteriology (June 30 to July 18, 1941). Hours in each course, 9:30 A. M. to 12:30 P. M. and 1:00 P. M. to 4:00 P. M. For further information concerning registration for the above subjects, send all communications to Professor John W. Williams, M.D., of the Department of Biology, Public Health, Massachusetts Institute of Technology, Cambridge, Mass.

RELATIONSHIP BETWEEN VENEREAL DISEASE CONTROL, THE NATIONAL DEFENSE, AND THE PROFESSIONAL SERVICES OF PRIVATE PRACTITIONERS

Unity of purpose—the control of venereal disease—characterizes two recent statements by the medical profession and by Federal and State agencies.

The first statement is the "Resolution on the Venereal Disease Program" adopted by the House of Delegates of the American Medical Association in June, 1940. The second is "An Agreement by the War and Navy Departments, the Federal Security Agency, and State Health Departments on Measures for the Control of the Venereal Diseases in Areas Where Armed Forces or National Defense Employees are Concentrated."

"During the World War, venereal disease in the Army caused the loss of almost 7,000,000 days—equal to a full year's absence from duty for 19,000 men," Surgeon General Thomas Parran points out. "Infections among military personnel originate in the civilian communities. Recent experience indicates that the venereal disease rate in a given military command reflects the efficiency of the

venereal disease control program in adjacent communities. The same is true for industrial defense concentrations.

"Effectively carried out," Doctor Parran emphasizes, "the 8-point cooperative program will contribute substantially to the physical fitness of men in the armed and industrial defense forces, and should be of far-reaching importance to the future control of venereal disease. But this must be a cooperative program between health officers, military authorities, police agencies, citizens—and private physicians.

"Recent statements and actions of the American Medical Association demonstrate that, as always, the physicians of the United States will rise to the obligations asked of them."

VDI an Aid to the Private Practitioner. Increasing demands on private physicians occasioned by the national defense program, accents the need for reliable, current and usable information regarding venereal disease.

Venereal Disease Information presents a monthly digest of the important papers on diagnosis, treatment, pathology, laboratory research, and public health from the entire world. In addition, it publishes important special papers and reports by leading scientists. It is designed to keep both the specialist and the general practitioner informed of developments in clinical management and public health control of syphilis, gonorrhea, and the venereal diseases.

This medical journal of venereal disease has been highly recommended by leaders in all fields of public health. In a rapidly developing and changing field of medical science, the physician interested in venereal disease control from the standpoint of differential diagnosis and treatment will find V. D. I. an important aid.

Venereal Disease Information is published monthly by the U. S. Public Health Service. Today it ranks as the Government's "best seller," with the highest paid circulation of any Federal publication. It is available at 50c per year to all physicians.

All orders should be directed to the Superintendent of Documents, Government Printing Office, Washington, D. C. Subscription fee, 50c per year, in check or money order, *not stamps*.

PAN-AMERICAN LEAGUE AGAINST CANCER

An organization which is to carry on in the Western Hemisphere the scientific and social work of the International Union Against Cancer has been incorporated under the laws of the State of New York as the Pan-American League Against Cancer. One may recall that the International Union Against Cancer was an organization actively engaged in the fight against cancer on an international scale. Fifty-two countries were affiliated with the International Union which maintained headquarters at Paris, France, until recent events.

The creation of the Pan-American League is due to the efforts of Professor Francis Carter Wood of New York, Professor Angel H. Roffo of Buenos Aires and Mr. Boris Pregel, respectively vice-president, member of the Board of Directors and president of the Finance Committee of the International Union Against Cancer, with the cooperation of many other outstanding personalities in the field of cancer and members of the International Union Against Cancer, throughout the American continent. Professor Francis Carter Wood headed the Organizing Committee of the new League and the presidency will be assumed by Angel H. Roffo, Professor of Cancerology at the University of Buenos Aires, Founder and Director of the Instituto de Medicina Experimental, the leading institution for cancer research in Latin America.

The aims of the new organization, as outlined in the certificate of incorporation are:

(a) To promote and encourage the international fight against cancer; (b) to coordinate in the countries of the American continent the scientific study and research in cancer and to publish and disseminate information thereon; (c) to engage in social welfare work in its relation to the problem of cancer; (d) to promote the establishment of national organizations throughout the Western Hemisphere to engage in similar activities.

The comprehensive program of the activities of the Pan-American League will include, it is hoped:

(a) Publication of a Pan-American Cancer Journal to serve as a permanent medium of information on the activities of the League and its affiliated national organizations; (b) organization and main-

tenance of a Pan-American center of information and statistics on cancer; (c) establishment of a Pan-American system of fellowships, scholarships, endowments and exchange of scholars and students; (d) among its immediate projects are: The organization of a *First Pan-American Cancer Week* to be held simultaneously in all the countries of the American continent on the pattern of the First International Cancer Week of 1938 which was held simultaneously in forty countries throughout the world. The holding of a *Pan-American Congress for the Scientific and Social Fight Against Cancer*. It is anticipated that this Congress will take place at Buenos Aires in 1942 under the chairmanship of Professor Angel H. Roffo and the honorary presidency of His Excellency, Dr. Roberto M. Ortiz, President of the Argentine Republic. The Congress will coincide with an exhibition devoted to the scientific, social and technical aspects of the fight against cancer, sponsored by the Pan-American League Against Cancer.

EIMER & AMEND CELEBRATES 90TH BIRTHDAY BY ACQUIRING NEW PLANT

Founded in 1851, at the corner of Third Avenue and 18th Street, Eimer & Amend has been a landmark in New York for ninety years. Ernest Child puts it in his book, "The Tools of the Chemist," saying: "The firm of Eimer & Amend may well be called 'Fathers of the modern American chemical apparatus business'."

Most of us, if we live to be ninety, won't be looking for new and larger living quarters. This is not so, however, with Eimer & Amend whose pharmaceutical division appears to have discovered the "Fountain of Youth."

Last week the real estate sections of the New York papers carried a detailed report of the purchase by Eimer & Amend of a new, larger plant at the corner of Greenwich and Morton Streets, on the west side of Manhattan. The new plant constitutes a seven-story, completely fire-proof building containing 180,000 square feet.

Present plans contemplate equipping the new plant with modern offices, display rooms, glass blowing shops, engraving rooms, instrument shops, laboratories and chemical manufacturing equipment, as well as the most up-to-date equipment for the handling of the thou-

sands of orders received each year. Design of the new facilities is already under way and the new plan will be opened about September first of this year.

It has often been said that the growth of chemical technology has followed the development of new tools for the chemist. Eimer & Amend's preeminent position in the field of developing such tools will be further enhanced by their new quarters.

Iowa

A group of 25 Iowa registered technologists met in Des Moines the week of April 21st in conjunction with the Iowa Hospital Association and organized the Iowa Association of Medical Technologists. Plans are being formulated to affiliate with the National Organization.

American Society of Medical Technologists

Program of the Ninth Annual Convention

JUNE 2, 3, 4, 1941



WADE PARK MANOR
Headquarters
Park Lane at East 107th St.
CLEVELAND, OHIO



COMMITTEE CHAIRMEN

Program—DOROTHEA ZOLL, Philadelphia, Pa.

Exhibits—MARIAN BAKER, Belleville, N. J.

Publicity—MARION GIANNINY, Philadelphia, Pa.

Local Arrangements—MARTHA KLEIN, Akron, Ohio.

Entertainment—MARY B. LEISMAN, Louisville, Ky.

Sisters' Reservations—SISTER M. EULALIA, Cleveland, Ohio.

Registration—BETTY SOLIDAY, Toledo, Ohio.

* * * *

REGISTRATION—Members and guests are requested to register upon arrival, at the registration desk, Wade Park Manor.

RESERVATIONS—If you have not already made your reservations, write immediately using form in front advertising section of this issue of the Journal.

ACCOMMODATIONS for Sisters wishing to attend the Convention and desiring reservations. Please signify intentions at an early date by communicating with one of the members of the following committee:

Sister M. Eulalia, St. John's Hospital, Cleveland, Ohio.

Sister M. Inez, Mercy Hospital, Canton, Ohio.

Sister M. Teresita Coleman, Providence Hospital, Beaver Falls, Pa.

TRANSPORTATION—For transportation, see your local agent for fares and routes.

American Society of Medical Technologists

NINTH ANNUAL CONVENTION

HEADQUARTERS, WADE PARK MANOR
CLEVELAND, OHIO

JUNE 2-3-4, 1941

Registration June 2, 8:30 A. M. to 10:00 A. M.

Exhibits Open 12-2 and 4-9 P. M. Daily

MONDAY MORNING, JUNE 2—10 A. M. to 12 M.

Presiding—DOROTHEA ZOLL, M.T., Philadelphia
Pa.

OPENING SESSION

INVOCATION by the Reverend Robert B. Whyte
of The Old Stone Church, Cleveland, Ohio.

ANNOUNCEMENTS

PRESIDENT'S MESSAGE—Henrietta M. Lyle, M.T.,
Columbia, Penna.

1. "The Distribution of Responsibility Between
the Medical Technologist and the Clinical
Pathologist"—DR. M. BODANSKY, Director
of Laboratories, John Sealy Memorial Re-
search Laboratory, Galveston, Texas.

SELECTION OF CONVENTION DELEGATES

MONDAY AFTERNOON, JUNE 2—2 P. M. to 5 P. M.

Presiding—FRIEDA H. CLAUSSEN, M.T., St. Paul, Minn.

1. "The Role of the State Counsellor"—CLARA M. BECTON, M.T., Tulsa, Oklahoma.
2. "Identification of Diphtheria Organisms"—NYLAH TOM, M.T., Austin, Texas.
3. "Some Recent Advances in Medical Technology"—DR. LALL G. MONTGOMERY, Director of Laboratories, Ball Memorial Hospital, Muncie, Indiana.
4. "A Successful Blood Bank in a Non-Teaching Hospital"—SISTER MARY ANTONIA KLAPEKE, M.T., St. Joseph's Hospital, Lexington, Kentucky.
5. "Photography in the Clinical Laboratory"—PHYLLIS STANLEY, M.T., Presbyterian Hospital, Newark, N. J.

MONDAY EVENING, JUNE 2

Refer to Entertainment Program.

TUESDAY MORNING, JUNE 3—9 A. M. to 12 M.

Presiding—EVELYN N. JARDINE, M.T., Hanover, New Hampshire.

1. "Method of Identifying Sulfanilamide, Sulfapyridine and Sulfathiazol Crystals in Urine"—JACK M. AARONS, M.T., Laboratory Dept., Station Hospital, Camp Hulen, Texas.
2. "A Simplified Complement Fixation Test for the Diagnosis of Leptospirosis (Weil's Disease)"—DR. FRED BOERNER and MARGUERITE LUKENS, M.T., Graduate Hospital of the University of Pennsylvania, Philadelphia, Pa.
3. "Method of Propagation and Maintenance of Viruses"—DR. G. O. FAVORITE, Associate Professor of Pathology, Hahnemann Medical College and Hospital, Philadelphia, Pa.
4. "Keeping Up With Scientific Literature"—DOROTHY ASHER MEYER, M.T., Chicago, Ill.
5. "The Measurement of the Red Blood Cell"—DR. RUSSELL L. HADEN, Cleveland Clinic, Cleveland, Ohio.
6. "The Photoelectric Colorimetric Determination of Uric Acid by the Benedict Direct Method"—FABRY HAWK, M.T., Morgantown, W. Va.

TUESDAY AFTERNOON, JUNE 3—1 P. M.

Refer to Entertainment Program.

TUESDAY AFTERNOON, JUNE 3—2 P. M.

SESSION OF THE HOUSE OF DELEGATES

Members are advised to follow entertainment program if not in session with the House of Delegates.

TUESDAY EVENING, JUNE 3

Refer to Entertainment Program.

WEDNESDAY MORNING, JUNE 4—9 A. M. to 12 M.

Presiding—RACHEL M. LEHMAN, M.T., Indianapolis, Ind.

1. "Method of Preparation and Study of Endoscopic Biopsy Tissues and Bronchoscopically Aspirated Specimens of Bronchial Secretions"—DR. CHEVALIER L. JACKSON, Dept. of Broncho-Esophagology, Temple University Medical School, Philadelphia, Pa.
2. "The Management of a Blood Bank Including the Preparation and Use of Desiccated Plasma"—DR. F. W. HARTMAN, Director of Laboratories, Henry Ford Hospital, Detroit, Mich.
3. "A Study of Hematopoiesis in a Group of Female Students Through a Study of Gastric Secretions and Correlated Blood Counts"—SISTER M. ALCUIN ARENS, M.T., St. Mary's Hospital, Duluth, Minn.
4. "Quantitative Methods in the Anemias"—DR. A. H. SANFORD, Mayo Clinic, Rochester, Minn.
5. "Hormone Assays"—DR. ANNA M. YOUNG, Dept. Laboratories, Mount Sinai Hospital of Cleveland, Cleveland, Ohio.

WEDNESDAY AFTERNOON, JUNE 4

Refer to Entertainment Program.

WEDNESDAY EVENING, JUNE 4

RECEPTION

ANNUAL BANQUET

Refer to Entertainment Program.

ENTERTAINMENT PROGRAM

MONDAY, JUNE 2

6:30 P. M.—Dinner at THE SOUTHERN TAVERN.

This will be an informal dinner at The Southern Tavern, East 105th and Carnegie. "Good food and dancing in a night club atmosphere."

9:00 P. M.—Entertainment

Through courtesy of the Cleveland Society of Medical Technologists. Details to be announced.

TUESDAY, JUNE 3

1:00 P. M.—Luncheon at the Wade Park Manor.

The "souvenir" luncheon that was so popular last year will be repeated, in the Green and Gold Room of Wade Park Manor. The remainder of the afternoon is left for visiting the exhibits of the American Medical Association for those not attending the session of the House of Delegates.

The evening is left free to enable the membership to take advantage of the various entertainment facilities afforded by the city of Cleveland. Detailed information will be available at the Registration Desk.

WEDNESDAY, JUNE 4

2:00 P. M.—Sight-seeing Trip.

At 2:00 P. M. motor coaches of the Cleveland Railway Company will leave from the Wade Park Manor, taking us on a two hour sight-seeing trip around the city. The trip covers as much of the desirable territory and as many of the principal points of interest as possible in this time. The itinerary includes the Public Square, the Terminal Group of Buildings, St. John's Cathedral, a wonderful view of the Cuyahoga River and Valley, otherwise known as the "flats", the Lakeview Terrace Housing Project, a magnificent view of the Harbor and Lake Front, Lakeside Yacht Club, Kirtland Park, Gordon Park, Rockefeller Park, including the Western Reserve Historical Museum, the Shakespearean Gardens and the Cleveland Art Museum, Shaker Square, University Circle, John D. Rockefeller's birthplace, John Huntington Polytechnic Institute, Cleveland Institute of Music, Fenn College, Trinity Episcopal Cathedral, and many other interesting places.

7:00 P. M.—Reception at the Wade Park Manor.

A reception by courtesy of the A. S. Aloe Company, St. Louis, Missouri.

8:00 P. M.—Annual Banquet.

Following the reception the banquet will be held in the Green and Gold Room of the Wade Park Manor. The awards for the best papers and exhibits will be announced. The main speaker will be Dr. Roy R. Kracke of Emory University, Georgia. Dr. Lall G. Montgomery, the new head of the Board of Registry, will also say a few words at this time. This will be the gala event of the convention.

EXHIBITS AND EXHIBITORS

1. Measurement of the Red Blood Cell.
Russell L. Haden and Irene Sparks, Cleveland Clinic, Cleveland, Ohio.
2. Museum Technic.
Ethel Lieb, Museum of the Institute of Pathology, Western Reserve University, Cleveland, Ohio.
3. Medical Illustrations by Color Photography.
Benjamin S. Kline and William Stevenson, Mt. Sinai Hospital, Cleveland, Ohio.
4. The Clinical Significance and Measurement of Acidosis and Alkalosis by Colorimetry of CO_2 .
N. G. Exton, F. Schattner, A. R. Rose, Prudential Insurance Company, Newark, N. J.
5. Exhibit to be announced.
J. E. Ash and F. Kramer, Army Medical Museum, Washington, D. C.
6. Exhibit to be announced.
Patric Claiborne, Doctors Hospital, Washington, D. C.
7. Poster Series Reporting Information Concerning Exhibit at Southern Medical Meeting.
Kentucky Society of Medical Technologists.
8. Exhibit to be announced.
North Carolina Society of Medical Technologists.

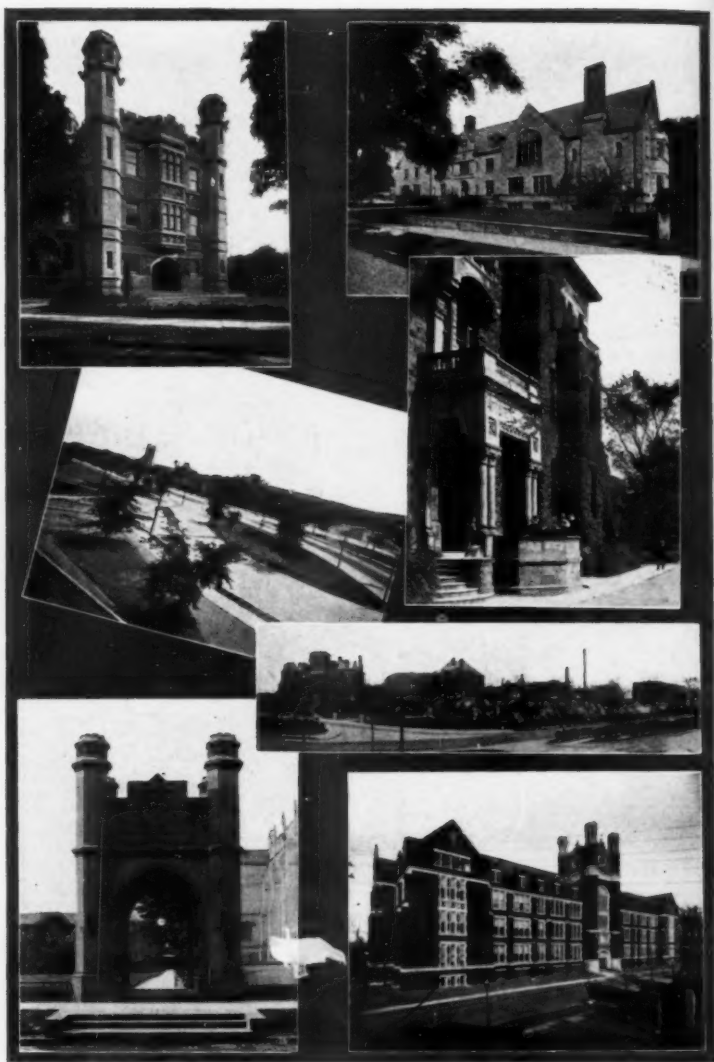
TECHNICAL EXHIBITORS

1. Kimble Glass Co., Vineland, N. J.
2. Difco Laboratories, Inc., Detroit, Mich.
3. A. S. Aloe Co., St. Louis, Mo.
4. A. H. Thomas Co., Philadelphia, Pa.
5. Central Scientific Co., Chicago, Ill.
6. Clay-Adams Co., New York, N. Y.
7. Denver Chemical Co., New York, N. Y.
8. Lederle Laboratories, Inc., Chicago, Ill.

Wade Park Manor



Cleveland, Ohio



Educational Centers, Cleveland, Ohio—Top, left to right: (1) Mather Memorial Building of Flora Stone Mather College, the women's Liberal Arts Department of Western Reserve University; (2) - (7) Typical High Schools; (3) Typical of the many scenic drives in Cleveland's suburban area; (4) Entrance to Adelbert College of Western Reserve University; (5) Case School of Applied Science Campus, overlooking University Circle; (6) Entrance to Flora Stone Mather College.

